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CONFESSIONS OF AN ALTERNA ADDICT: THE CARE AND BREEDING OF THE GRAY-BANDED KINGSNAKE. PART 2

Joel Eidbo

In part one, I mentioned how important it is to select a healthy gray-band. If the newly acquired snake passes through all the earlier exams, appears healthy, and then eats right away, wonderful! Sooner or later, though, one of your gray-bands is going to go off-feed. Often an *alterna* will stop feeding for no apparent reason. If the snake had been eating regularly before and has good body weight, be patient.

If for no other reason, meticulous record keeping provides exact information on each gray-bands' eating habits. It is easier to know a snake is fasting if you know when it last ate. I keep records of each snakes' feeding habits, including what was eaten, when, and how much, live or dead; and any problems. Dates of shedding are recorded, as are complete breeding records. Every spring, immediately out of hibernation, each snake is carefully weighed. Pre-hibernation and post-egg-laying weights are also recorded. After a couple of years, a complete record is formed of an individual snake. At a glance, it can be determined if the snake is growing and maintaining good body weight, and when it tends to go off-feed. If a gray-band maintains its weight during a fast, I'm much less concerned then if the snakes' weight is steadily decreasing.

The worst thing to do around gray-bands is panic. Wait for at least a couple of weeks and consider the following points. Has the cage or outside temperature suddenly changed? Is the cage clean? Make sure to check throughout the substrate; on occasion I have found an uneaten and decomposing mouse buried in the substrate. I don't know about the snake, but finding a week old mouse didn't do much for my appetite. Is the substrate dry—a spilled water dish can soak the substrate and put a snake off-feed. How close is it to hibernation time? Remember, *alterna* will often go off-feed a few weeks prior to hibernation. This is normal, so don't get excited and try to force-feed the snake. Maybe the snake is just getting ready to shed. Snakes are individuals, and some of my *alterna* take a long time to complete a shed, while others complete the cycle in a week. This may sound dumb, but maybe the snake is gravid? Most gravid females go off-feed for a few weeks before egg deposition. Likewise many breeding males will refuse to eat during breeding season.

Assuming everything checks out okay, but the snake still won't eat, it may be necessary to consider more serious possibilities. Feel the cloacal area, evidence of a vague fullness may indicate constipation. A warm water soak for 30 minutes for 2-3 days will often loosen things up. Reexamine the animal for mites, mouthrot, unshed skin, or bite marks from a previous meal open the mouth and see if a piece of substrate has become lodged inside. The presence of any of these irritants is enough to cause fasting.

If there is no identifiable cause of fasting, either the snake is fine, and will resume feeding on its own, or something is wrong that can't be seen externally. Again, if the gray-band looks healthy, and has good body weight, try waiting it out. Continue to try feeding,

because many times gray-bands will resume feeding just as mysteriously as they stopped.

Listen to the snakes breathing. Is it noisy, or labored? Do bubbles, froth, or mucous build up around the mouth? Any swelling of the upper third of the snakes' body? These symptoms suggest respiratory illness. Mild symptoms can be managed conservatively by keeping the snake in a uniformly warm, dust-free environment. An incubator set at 86°F. Provides a constant warmth. Mild symptoms will often resolve quickly, and the snake remains alert and active at all times. More serious illness produces a sluggish or listless snake, and requires immediate medical care. At any time, should concern arise, take the animal in to a vet. A serious illness often requires antibiotics, and only a trained veterinarian is able to provide the correct drug with the correct dose.

I feed my *alterna* twice a week, or every four days. Each adult is offered frozen thawed weanling mice, up to four a week, depending on the size of the *alterna*. Occasionally I offer live fuzzy or weanling mice, but I never feed adult mice, live or frozen. It is my opinion, that several smaller mice are a better meal than one large one. Smaller mice are more easily and quickly digested. Juvenile *alterna* also are fed fuzzy mice, but only one or two per week. Hatchlings are also fed every four days, and receive one to three pinkies. Uneaten mice are either fed to a garbage snake, my leopard geckoes, or flushed. The mice are usually placed into the cage at night, and removed if uneaten in the morning. A strip of red adhesive tape is fixed to the front of each cage where a snake didn't eat. At the next feeding, I pay closer attention to the cages with the red flags. If a cage gets 4 red flags, I begin the process of evaluating a fasting snake as discussed.

On the opposite side of fasting is obesity. Some *alterna* are like some people, and don't know when to say no. Obesity is easily avoided by carefully monitoring each snakes' food intake and weight (another compelling reason for careful record keeping). I once bought an adult female that weighed 368 g. She looked like a sausage. I tried to breed her, and she laid one egg, and retained 9 others. Obesity is one well known cause of egg-binding.

Once each year, in the spring, after all my gray-bands are feeding, I give each adult a small dose of calcium and vitamins. Vitamin and calcium powder is mixed in water, forming a slurry. About 1 cc of this mixture is given to each adult by feeding tube. I give this mixture because of a recurring problem with egg-retention.

Egg-retention or egg-binding is a condition where the gravid snake fails to lay all her eggs, and retains one or more inside her body. In some cases the retained eggs can be gently manipulated down to the cloaca and carefully teased out. Sometimes a retained egg can be collapsed by inserting a needle through the body wall of the snake into the egg and sucking out the egg contents. After being aspirated, the collapsed egg is often passed by the snake. I have had several examples where the retained eggs are solid, calcified, immobile masses. They may represent unfertilized ova from the previous season, but are rarely palpable. The only hope for these solid masses is surgical intervention.

There are many possible causes of egg-binding, including calcium/vitamin deficiency, obesity, immaturity, and sometimes previous

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• Due to the length of Joel Eidbo's article on Gray-banded kingsnakes the usual sections for announcements and new publications have been omitted from this issue.

surgery. The end result of egg-binding is a gray-band plugged with ruined eggs, headed for surgery or death. In either case, the snake will probably not breed again. Since I started giving the calcium slurry, I have had only one egg-bound gray-band in two years, where previously, I had as many as three in one year. Draw your own conclusions, but it seems to work for me.

By now, there's probably no-one left reading the article. Indeed, I have purposely tried to at least touch on all the hazards and difficulties involved in gray-band husbandry. I do this because I'm trying to make this a complete guide, with the hope that if you encounter any problems, at least a description of that problem will be here, and maybe even a solution. Please don't let an emphasis on the dangers deter interest in one of the most beautiful and fascinating snakes in existence. I think there is more of a sense of accomplishment with a difficult snake than an easy one. Perhaps the culmination of a herper's hobby is the successful breeding of his favorite animals. And, at some point, everybody will want to try and breed gray-banded kingsnakes. Getting gray-bands to breed isn't that difficult, but success, measured by the number of healthy young produced, is much harder to come by.

Success can only be measured by the number of healthy hatchlings; it is not unusual for an *alterna* to lay a fertile clutch of eggs, and yet no young hatch out. Why? Sorry to sound discouraging, but gray-band eggs sometimes go full-term, but the young fail to slit the shells, and die inside. A breeder might count these dead eggs as fertile, but what's the point? It may be related to calcium deficiency, in that decreased calcium levels in the mother may prevent the formation of a healthy egg-tooth. Keep this in mind when it comes near to hatching time. As soon as I see a slit in one egg of a clutch of *alterna*, I wait 24 hours, and then carefully slit all the still-unopened eggs. Leave the hatchlings alone, just provide an exit.

I have also seen fertile, and otherwise healthy appearing *alterna* eggs die off, ruining an entire clutch. Postmortem examination of the eggs reveals dead embryos in various stages of development. It happens all the time to other breeders too, and it is incredibly frustrating. This is not the same thing as a single egg in a clutch going bad, discoloring, and then molding. In this example, the *alterna* eggs seem to solidify or harden, as if infertile. My theory,

totally unsupported by any study or research is that *alterna* eggs are more sensitive to rotation than most colubrid eggs. In my collection, a clutch of *alterna* eggs is carefully transferred to vermiculite and then to the incubator with no turning, and as little vibration as possible. Once I started these precautions, egg mortality has dropped off markedly.

So remember, the fun doesn't stop once the eggs are laid! We have already discussed general aspects of health, and how to start keeping and feeding *alterna*. All of the guidelines apply when breeding: start with healthy adult gray-bands, animals feeding well, with good body weight, that have passed through the gauntlet of inspections already described. Don't attempt to breed an animal that isn't large enough, old enough, or in any other way up to standards. It will only cause misery. Two year old *alterna*, both male and female, have been successfully bred, but it's better to wait until the third year.

Over the last three seasons, I have conducted an experiment to try and determine, by weight, how big a female needs to be before attempting to breed. I chose weight instead of length because of how notoriously difficult it is to get an accurate measurement on a snake. Two people may measure the same snakes' length and get two different numbers. Weighing a snake right out of hibernation is the most valid, and easily reproduced measurement. As long as the scales are accurate, two different people should get the same weight on the same snake.

By trial and error, I have come up with a weight of 150 g post-hibernation. A female less than 150 g may breed, but there is an increased risk of egg-binding, infertility, and death. During the last two years, I tried breeding females as small as 100 g, and as large as 368 g. Thirty-six clutches were laid from 27 females. Ten of the 27 females weighed less than 150 g. Three of the females weighed between 100 and 110 g. Of this trio, only one produced fertile eggs, one died gravid, and one laid pills. 4 females weighed between 110 and 130 g. Two of the four laid fertile eggs, one laid pills, and one died gravid. 3 females weighed between 130 and 150 g. Two of the three produced fertile eggs, but the third female died gravid. All of these 10 females entered the breeding season healthy, and feeding. Out of the 10, 3 died, 2 produced pills, and the remaining five produced only 30 healthy young.

Seventeen females weighed over 150 g, and none of these females died gravid. Three died because of egg-retention (before I started giving vitamin supplements). A total of 112 healthy babies were produced. In comparison, 10 females less than 150 g produced 30 young (and 3 dead adult females), while 17 females greater than 150 g produced 112 young. What's more, the smaller females' young tended to be smaller too, and were difficult to get started. For the actual number of healthy young produced by the smaller females, the mortality rate was just too high. Future studies are planned for the specific weight class of 130 to 150 g, but for now, I wait until my female *alterna* weigh at least 150 g post-hibernation.

Successful breeding requires a hibernation (brumation) period. I know of no documented example of gray-banded kingsnakes breeding without a cool-down. In captivity, hibernation is usually induced by artificially lowering the room temperature, through air conditioners in the south, to open windows in the north. In my snake room, I have installed two ventilators connected to the outside. One fan drives the air from the snake room to the outside for odor control, the other fan draws air from the outside into the snake room, creating an air flow circuit. In the winter, I can cool the temperature quickly down to an even 50 degrees. A furnace duct is also in the room, and the combination of fans and furnace permits me to accurately control temperature.

How cool the snakes get is a matter of personal preference. For example, some breeders believe it necessary to cool *greeri* down to the low forties. A friend of mine was so disgusted with the low fertility of his *greeri*, supposedly due to an inadequate cool-down of the males, that he put the males outside in his garage for the winter.

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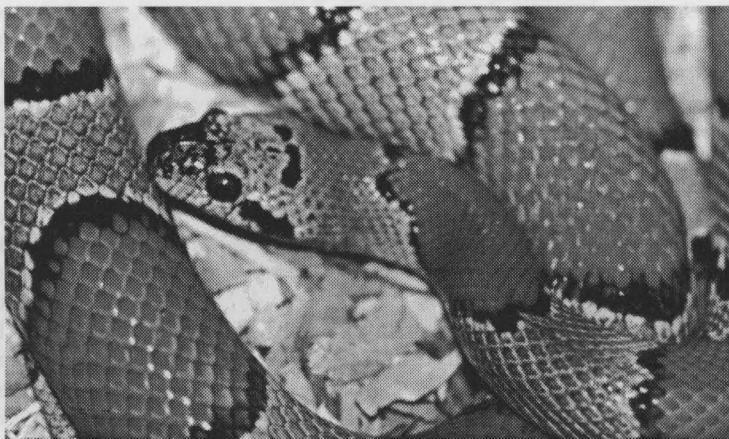
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Fortunately gray-bands are not the problem that Greer's kingsnakes are. Here are the hibernation details that I follow every year. Many male *alterna* go off-feed in early October, so I actually start cooling the snakes November 1st. Two weeks prior, I stop feeding all the snakes set for hibernation. Two weeks gives the *alterna* enough time to complete digestion of their last meal. All of the cages are carefully cleaned and disinfected, in preparation for the long brumation period.

At the start of hibernation, the heat tapes are turned off, and the temperature drops to about 70°F in one or two days. Then the ventilators are turned on, and over the next week, the temperature slowly drops to the low 60's. Next, the furnace duct is closed, and all lights turned off. By the end of the second week, the temperature is in the upper 50's. Due to fluctuations the weather outside, the temperature in the hibernaculum will vary, sometimes warming into the mid-60's, sometimes cooling into the low 50's. The temperature is charted every day, and if it appears to be drifting close to 50°F, I inch open the furnace duct. From November 1, until March 1, the snake room is kept cool, dark, and quiet. Once a week the cages are checked; occasionally a snake enters a shed during hibernation, or a water dish is overturned. Each cage is closely monitored for any such problems, and if necessary, a snake will be pulled out of hibernation and warmed up. A water dish is left in each cage, and during the weekly checkup, is emptied and refilled with fresh water.



Both the juveniles and the adults are hibernated. One snake per cage—I discovered the danger of leaving two or more snakes in the same cage during hibernation. A remarkable male Pueblan milk snake attempted to copulate with his cage-mate in the middle of January. During the weekly check, he was found with a swollen, blackened, protruded hemipene, which subsequently sloughed off after warming him up. Not a snake to give-in to adversity, he fathered three clutches a year, with 100% fertility from his mate, for the next two years, until I sold the pair.

Hatchling *alterna* are fed year-round. Hatchlings that are not feeding are either pinkie-pumped or hibernated. Some breeders report successful conversion of a non-feeding hatchling into feeding on pinkies, just by hibernating the hatchling.

Come March first, the heat tapes are turned on, and the cages brought up from the 50's to the low 70's. The fans are turned off, and the furnace duct reopened, to raise the temperature up to 86°F over the hot spot. The lights are back on too.

After a couple days of adjusting, each snake is carefully examined and weighed. This is the post-hibernation weight that I use to decide which *alterna* are ready to breed. By comparing the current weight to last years' weight, I can also determine if any gray-band has lost weight, or is in poor health. About four days out of hibernation, the first feeding occurs. Typically, only about half the gray-bands eat; by the third week out, usually all have fed. By now, many have shed for the first time.

For the first month out of hibernation, the adults are fed often, maybe three times a week, with small meals each time. Attention is paid to both males and females. It is as important to have good body weight on the males as it is the females, because in the heat of breeding, many males will not feed.

When a likely pair have each shed, the female is placed into the male's cage and observed. Often, the female will start a tail-thrashing action, acting hostile towards the male. At the same time, however,

the male will often start a spasmodic jerking motion, like an exaggerated nervous tic, next to the female. What you're seeing is courtship, gray-band style. If the female shows no interest, the male may continue twitching for hours, following after the irate female. Eventually he will retreat. There may be mad chases around the cage, as the female tries to escape the male. Mating, if it is going to occur, usually happens quickly, sometimes five minutes after introducing the female. I usually separate the pair after two hours if no mating has taken place. No harm comes to the snakes if you leave them together, but I like to keep records of copulation, such as time, duration, etc.

It is common knowledge, that for some reason, many female *alterna* will not breed until after a second, or even a third shed. I have noticed this in some of my females, and it is most often a wild caught female that displays this pattern. Captive born females are less likely to wait for a second shed. A ready to breed female often displays what is known as "cloacal gaping." She raises her tail in a stately manner, and while slowly moving around the cage, holds her cloaca open. Any male ready to breed should be twitching after her in minutes, and if not, try another male.

The luxury of having at least two males becomes obvious. We have all had males who show no interest in breeding. If no backup is available, a whole season could be lost. If one male proves to be infertile, likewise a whole season is shot. In addition, if one male is reluctant to breed, the introduction of a second male into his cage can stimulate combat.

Combat in *alterna* is much more civilized than other colubrids. None of the wild biting and coiling you might see between a couple of male Pueblans. Two male *alterna* will chase each other around rapidly, wrestle with loops of their bodies, and sometimes some mild coiling occurs. I have never had any combat result in injury to either snake. On the upside, combat often triggers intense breeding interest in both males. When the combat is over, they are separated, and a female is placed with each male. A formerly reluctant suitor is now often an aggressive breeder.

Time and other breeders have taught me some tricks to help induce breeding: spraying a light mist of water into a cage with a pair may stimulate copulation. Placing a freshly shed female skin in with the male is an aphrodisiac. Watch the outside weather. When a rainstorm threatens, put every conceivable pair together, because the drop in barometric pressure seems to really stimulate mating activity. I have had five pairs of *alterna* mating simultaneously during a thunderstorm. It may help to put a female directly into a cage with two males in combat. Although I don't recommend it, some say that putting a pair into a snake bag, and taking the bag for a drive will initiate mating. Finally, try covering the cage completely to insure the snakes privacy.

Copulation between gray-bands is typical of colubrids. The male entwines his tail around the female, while pinning her body down with his body on top in an "S" formation. I have never noticed male *alterna* to bite the necks of females, as other colubrids will do. The male thrusts his tail back and forth along the female, trying to maneuver his cloaca and hers into the right position. In an eye-blink, he then everts his nearest hemipene, and copulation occurs. In the matings I have witnessed there are usually many unsuccessful attempts made, and you can see the hemipene flash out and miss, before a successful connection is made. The two snakes are together for at least fifteen minutes, and may stay in copulation for hours.

After separation, many breeders will take a swab, gently collect a sperm sample from the females cloaca, and examine it under a microscope for motile, and healthy appearing sperm. A "dud stud" is a vigorous male, willing to breed, whose sperm sample shows nothing but dead sperm, or abnormal forms of sperm, and is therefore considered to be shooting blanks.

One successful copulation may be enough to produce high fertility, and healthy young. Most *alterna* breeders that I know will try and get the female mated several times, often to different males. Multiple copulations diminishes the danger of a hidden dud stud ruining an entire clutch, and also increases the chances of fertile eggs being produced by providing a wide window of fertilization opportunity.

No one really knows when a female comes into heat, although cloacal gaping is a good indicator. Ovulation is obviously a good sign, and can be detected by letting the female crawl loosely across your hands, and gently palpating her abdomen. The ova feel like vague lumps that bump across your fingertips as the snake crawls over your hands. Feeling the ova is a good sign of readiness, but I have had more than one female with palpable ova breed, only to pass through the entire season without laying eggs. Whether I was wrong, and did not feel ova, or whether the snake actually reabsorbed them, I don't know.

During the intensity of breeding season, males often go off-feed. As was discussed earlier, the first month after hibernation is used to "beef" them up as much as possible. Close attention should be paid to the males when they stop feeding, and if necessary, remove them from the breeding cages and isolate them if they appear to be getting thin. Females will continue to feed, and a good sign of a gravid female is a sudden increase in appetite.

After a while a gravid female is obvious. The lower two-thirds of her body start to swell, and the skin between the scales becomes prominent. At times, a gravid female looks like a sausage ready to burst. The dorsal spine may become prominent as the egg burden redistributes the load on the lower two-thirds. By this time, the female will usually not feed. Soon she will enter a pre-laying shed. While waiting for the shed to happen, prepare the nest box and the incubator. A Rubbermaid shoe-box half-filled with slightly damp sphagnum moss fits nicely into the blanket-box type cage. A hole is cut into the lid of the shoe-box. When a gravid female first enters her pre-laying shed, I place the nesting box into the cage, and wait. Soon the female camps out inside the nesting box, and forms a cavity. On average, 8 to 10 days after the shed, the female will deposit her eggs. Don't disturb her until she is finished, or you risk egg-retention. It is safe to peek into the box, first to determine if eggs are being laid, and second to see if she's finished.

After completion of egg-laying, I remove the female from the nest box, put her back into her cage, weigh her, and immediately try to feed her. Almost all my females will eat that same day. Soon she will go into a post-laying shed. It is possible to double-clutch *alterna*, and I produced 19 healthy young from a female two years ago. She handled the added stress well, but two other females did not. I don't think *alterna* are a robust enough snake to do well with double-clutching, and I no longer even try.

Give the female several days, at least three, from the start of egg-laying, to the finish. Most will finish within 24 hours. It may take as long as a week to complete the process. If by the end of a week the female is still retaining eggs, you may have a problem. The degree of egg-binding determines what can be done. If a single egg is all

that's left, many options are available. Gentle palpation may stimulate deposition, or may bring the egg close enough to the vent to manually remove. A syringe can be inserted into the egg to aspirate the contents, and reduce the egg volume. Simple patience, and the snake may eventually deposit the tardy egg on her own. I have never seen fertility in a retained egg.

More than one egg being retained is a much greater problem. Let's cut to the chase here. In my opinion, you have only two choices: a vet, or patience. If the average person starts mucking around, the snake is likely to die. Patience may be rewarding, it's possible for the snake to finish laying over the next few weeks. If eggs are still present after 6 weeks or so, it's time for a vet to step in. Sometimes surgery can remove the eggs and still allow breeding, other times not. Ask the vet you use if he/she has experience with the problem. Don't hesitate to get an estimate; is it worth spending

over \$100.00 on medical bills? That is up to you, the owner. Frankly, I have spent good money on surgery, for a snake that never bred again. I have also had a snake lay good clutches two years in a row after surgery for egg-binding. I leave the decision up to the snake owner and his vet.

We have almost come full circle. From hatchlings to yearlings to adults, and now the eggs. Once the female is finished laying, carefully remove her from the nest box, and try and feed her. Take the nest box over to the incubator, and very carefully transfer the entire clutch of eggs from the nest box to the incubation box. I use the ubiquitous shoe-box, with only a

few small holes drilled into the rim for ventilation. The box is about 40% filled with moistened vermiculite. The degree of moisture is such that the medium clumps loosely in your hand. A small cavity is formed, and the entire clutch is then settled gently into the vermiculite. The box is returned to the incubator, and except for rare misting of the medium with aged water (stored in a spray bottle in the incubator), is left undisturbed until hatching.

Most *alterna* breeders incubate the eggs at a temp. range of 78-85°F. The temperature varies depending on the nature of the incubator. My incubator is pretty constant, and I incubate all my colubrid eggs at 82-83°F. At this temperature, *alterna* eggs will hatch in 63 to 71 days, and most of my clutches hatch around 65 days. If a clutch looks good, but has been incubating for greater than 68 days, recheck the record sheet, and confirm the length of incubation. Once again, accurate record keeping is a must. An unhatched clutch at 68 days is worrisome, and I will slit several of the eggs. On a couple of occasions I have noted perfect, healthy young, that proceed to finish hatching without incident. I have also noted an entire clutch dead in the shell, with fully formed, otherwise normal appearing babies. Out of all my *alterna* clutches, only 5 took longer than 67 days to hatch.

Actual hatching can take a week, or even longer. Once the shell has been slit, the baby inside may linger for days, absorbing the yolk. As long as all the eggs in a clutch have been slit open, be patient. Separate the hatching clutch into its own private container, to prevent two different clutches from mingling and confusing the parentage of the resulting young. I also like to place the eggs onto paper towels, because the fresh hatchlings are somewhat sticky, and would otherwise get covered with a layer of vermiculite. It usually doesn't take a full week for all the babies to leave the shell, and if one egg is still occupied when the rest have left, the baby may be deformed. Deformed babies are often able to slit the shell, and many



SUGGESTED READING

will hatch, depending on the severity of the deformity. It has always been my policy, that no matter how minor the deformity, even a very slight kink in the tail will result in the destruction of the snake. It is inexcusable to market deformed hatchlings, even if it is "only" a tail kink. We must strive for the absolute best, not the merely acceptable.

In three years of gray-banded breeding, I produced 296 total eggs. Out of these, 150 were healthy young, slightly less than 51%. An additional 23 babies were deformed, or dead in the shell. My fertility rate was thus 173/296 or 58%. 1994 was my best year; out of total of 118 eggs, I produced 72 healthy young (61%), and 5 dead in the shell or deformed, for an overall fertility rate of 77/118 or 65%. There are no bragging rights with numbers like these, but maybe when others breed *alterna*, they won't get discouraged with like results.

After the babies hatch, they will quickly enter into their first shed. That gives the average gray-band owner about one week to relax. After that is the most exciting and frustrating period: feeding hatchlings. Many articles and chapters exist on techniques to get stubborn hatchlings to feed. Read them, and try them, and don't be surprised if nothing works. Gray-band hatchlings are in my experience the most difficult baby snake to get started. In a year where I produced 65 *alterna*, only 5 babies initially accepted pinkie mice. Another dozen or so accepted lizard scented pinkies, and about 20 more took frozen thawed lizards right away. Gray-bands, by the way, don't seem to be very choosy about what type of lizard they'll eat. My hatchlings have taken fence lizards, anoles, house geckos, and even young skinks. Leopard gecko babies, however, are not on the menu. Anyway, about half of my hatchlings refused to feed.

The thirty or so babies that initially refuse to feed are patiently worked with, using such techniques as the split-head pinkie, lizard scenting, ceramic flowerpot hideboxes (described earlier), even putting a lizard tail in the mouth of a pinkie. Over time, I can usually convert 80-90% of all my *alterna* hatchlings to unscented pinkie mice. Many times the process takes months, and often involves pinkie-pumping. The pinkie pump is simply a syringe-like device that liquefies a pinkie and allows the pinkie puree to be force-fed into the recalcitrant snake. Even with patience, and every technique described, some hatchlings just won't feed. After two or three months of pinkie-pumping, go ahead and hibernate them. Sometimes stubborn babies will emerge from hibernation and begin feeding. Another note: once an *alterna* starts eating pinkies, it usually continues to do so, with only occasional lapses.

The last three to six babies that refuse food either die, or I trade them off cheaply to someone in the hopes that a change in environment stimulates some appetite. Many times I have shipped stubborn babies across the country just to see if the trip gets them to start eating. Amazingly, it has worked at least ten separate times. One final note on feeding hatchling *alterna*; a friend of mine has developed a product he calls SLS, for synthetic lizard scent. SLS is a powder sprinkled on pinkies, and in early trials, has shown great success in getting hatchling *alterna* to eat. SLS is currently being tested, and my friend hopes to market it soon.

Well, there you have it. Everything I can think of to help keep, raise, and breed the gray-banded kingsnake is in here. For the record, let me state that I don't consider myself an expert, but I believe the information contained herein is accurate, and I sincerely hope it is helpful. Best of luck to my fellow members of "Alternas Anonymous!"

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Book Review:

REPTILE KEEPER'S HANDBOOK

by Susan M. Barnard. 1996. Krieger Publishing Co., Malabar, FL, 252 pp. \$58.50, ISBN 0-89464-933-7

Breck Bartholomew

In the introduction to this book the author states, "although this book is written with the zoo keeper in mind, all reptile enthusiasts, amateur and professional alike, should find portions useful." In reading this book however, I found most of the information to be geared towards the amateur with some information useful to zoo keepers and professional keepers. I also found the book to contain a lot of information that will be of little use to most readers.

The first chapter, "Brief notes on nomenclature, taxonomy, anatomy, and physiology," is just that, brief. Trying to cover these topics in seven pages with 20 figures would be difficult for any author. In addition to being very superficial the chapter also contains a few errors. The errors are not serious, but they are annoying. For example, I could not find a single source to indicate that there are 25 species of crocodilians; a small group that is will defined as having 22 species.

Chapter two covers, "selecting, handling, and transporting." This chapter presents some basic information that all reptile keepers in zoos should have known before they became a keeper. Some of the information however, is subject to question. For example, in handling snakes and lizards the author states they should *always* be held behind the head. This is a very stressful method of holding these animals because it is exactly how a predator would grasp them. The author also recommends taping crocodilian's mouths, which is not a bad idea, but putting duct tape directly on the skin (as shown in figure 24) might cause unnecessary damage to the skin. Wouldn't it be better to put a cloth between the tape and the skin?

The captive environment is the subject of chapter 3. The author presents several cage designs, all of which are bare minimum and not very aesthetically pleasing. At one point it is stated, that, "heavy objects such as bricks can be used to anchor aquarium covers." Needless to say I was shocked when I read this. Putting heavy objects on cages is one of the best ways to insure that an animal will eventually escape. Sometime, some one is going to forget to replace the 'brick' and the animal will disappear in a flash.

Finally in chapters four and five on feeding and nutritional disorders and health, medical, and necropsy considerations respectively, the author discusses topics that are apparently of more interest to her. This is shown by the generally good survey of knowledge presented in these chapters. Although space limits the amount of detail each topic is given, several veterinary texts are cited and can be referred to for more information.

The last chapter covers reproduction and egg incubation. Again,

in trying to cover all reptiles the chapter is fairly basic. More specific information can be found in any number of books specializing of individual species or taxa.

Over 100 pages of the book consists of 14 appendixes of disputable value. Appendix I lists the climates, habits, habitats and approximate adult sizes of the reptiles of the world. I am not sure how this appendix is supposed to help a reptile keeper? The information is too general. For example, I picked two species that I have an interest in, *Platysaurus intermedius* and *Lampropeltis triangulum* to see what this table would tell me. *Platysaurus* is listed with all other lizards in the family Cordylidae. The range is listed as South Africa, the thermal regimes is temperate, subtropical and arid. The information for habits, habitat and adult size is equally general.

Lampropeltis triangulum is listed with all other *Lampropeltis*. Their habits and habitats is listed as, "all types of habitats from arid to humid, from sea level to high elevations, coastal areas to inland areas; frequently seen around human dwellings." The adult size is listed as 7" to 6'. I don't see what use this table is to me if I have a *Lampropeltis triangulum blanchardi* and need to know the correct habitat for its cage?

Five of the appendixes list the nutritional values of numerous plants and animals which may be used as food for reptiles. Another large appendix lists numerous plants known to be potentially dangerous to humans (not necessarily to reptiles). The appendix "miscellaneous therapeutics used in reptiles," lists several medicines and dosages, but does not explain metabolic scaling of dosages. Many of the dosages listed could be dangerous if given to a large reptile. Large reptiles require smaller, per kilogram, dosages than small reptiles because their metabolism is much slower.

Enough ranting. Obviously I found a number of problems with this book. However the book does have its good points and should not be ignored just because of this review. I would recommend that you examine a copy before buying it. Many people will find the book quite valuable, especially if you do not have a large number of books to refer to for the topics covered. My major complaint is that the book contains a lot of information that I classify as filler; I am not sure how useful it will prove to be. On the other hand much of the information provided does cover the topic well enough to be useful. Whether you buy this book should be a personal choice. Pick up a copy and look through it. If it looks interesting, and like you might learn something, buy it.

Book Review:

BIOGEOGRAPHY OF THE REPTILES OF SOUTH ASIA

by Indraneil Das. 1996. Krieger Publishing Co., Malabar, FL, 87 pp. \$27.50, ISBN 0-89464-935-3

Breck Bartholomew

South Asia, as defined in this book, includes Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka as well as the Andaman & Nicobar Islands. Das divides South Asia into ten physiographic zones, which he uses throughout the book to discuss biogeographic relationships of the reptile fauna. Of the 632 reptile

species occurring in this region more than half (402 species) are endemic, and three quarters of them are endemic to a single physiographic zone. With such a large number of species and physiographic zones a complete discussion of reptilian biogeography would be a daunting task. Das has chosen to offer a survey of the

topic in this book.

The book begins with a number of color plates featuring several reptiles of the region. The quality of the photographs is uniformly good. Following the plates is the title page, contents, etc. The bulk of the book is set up like a scientific paper with an introduction, methods, results and discussion. These sections are separated into "chapters." Chapter five, the largest chapter, consists of seven tables and is followed by a summary chapter.

With the exception of the very first sentence, I found the book well written. My only complaint with the text is that too much information is alluded to, rather than discussed. Although the bibliography contains a wealth of important resources, many of the papers cited will prove difficult to obtain within the USA. The need for obtaining each reference might have been alleviated by a more thorough discussion of their contents.

The layout of the book is generally good, but I question the inclusion of 36 color photographs which are not cross-referenced in

the text. Furthermore, the placement of the photographs at the beginning of the book is awkward and appears to be intended to promote book sales. The truth is, however, that this is a scientific book. The novice or herpetoculturist will be disappointed with the book, unless they have a strong interest in South Asian reptiles and their affinities to reptiles in adjacent regions. Those who buy the book because of the nice photographs will be in for a big surprise when they begin to read the book.

I would recommend this book to anyone with an interest in biogeography of South Asian reptiles. If you are interested in these animals but not interested in biogeography you might be disappointed. Also it should be kept in mind that the book is a survey of the topic and considerable library work will need to be done to obtain many of the references cited in the book. The bibliography is large and well compiled and will be a valuable resource.

Book Review:

KALEIDOSCOPIC TREE BOAS: THE GENUS *CORALLUS* OF TROPICAL AMERICA

by Peter J. Stafford and Robert W. Henderson. 1996. Krieger Publishing Co., Malabar, FL, 86 pp. \$28.50, ISBN 0-89464-975-2

Breck Bartholomew

Boas of the genus *Corallus* have long been admired by herpetologists and herpetoculturists for their beauty and variability. They have not been kept in captivity as much as many other boas for a variety of reasons, including their environmental requirements and temperament. While this book is not specifically written for the herpetoculturist it contains information that will prove invaluable to the serious keeper. This same information will appeal to the herpetologist who wishes to gain a basic understanding of these snakes.

The book begins with a summary of the Genus *Corallus* and their phylogenetic relationships to other boas. At only four pages this chapter offers only a brief summary of the evolutionary relationship of the genus.

The following chapter discusses the natural history of these snakes. Again at only six pages plus a table this chapter offers a good summary of the natural history of these snakes.

Species diagnoses and a taxonomic key to the four species is included in the following six pages. Some of the terminology may pose somewhat of a challenge to the novice, but the information required to understand the key and diagnoses is widely available. None of the terminology will prove to be a hindrance to anyone willing to do a little research; basic research at that.

Fifty-three color photographs are grouped together in the next section of the book. In general the photographs are good, but a couple are quite poor. The authors have chosen to include a few photographs of other species of boa (i.e., boa constrictor, anaconda, etc.) for illustrative purposes. They have also included a photograph of a green tree python to illustrate convergent evolution between this species and the emerald tree boa. Each photograph is referenced in the text, however somewhat arbitrarily (e.g., *Corallus hortulanus* photographs are referenced in the introductory paragraph of the species account as "Plates 6-33").

Following the section of photographs are four species accounts. These accounts vary in length and detail from 18 pages for *C. hortulanus* to four pages for *C. cropanii*. Although this may seem like quite a discrepancy, the length of the accounts correspond well with

how much is known about each species. Each species account contains sections for etymology, geographic range, description, longevity, and ecological data. Information provided in the species accounts is more detailed than the information covered in previous sections of the book and will prove useful to the herpetoculturist who realizes the importance of natural history and ecological data in the successful keeping of a species.

Captive husbandry and breeding is the subject of the final section of the book. Between the information provided in this chapter and the natural history and ecological data presented in the species account, this book compiles the most complete summary of information necessary to keep these snakes in captivity that I have seen.

Finally the book contains ten pages of bibliography. As one of the largest sections of the book, the bibliography will be valuable to both the herpetologist and the serious keeper.

Despite the fact that I liked this book, I do have some criticism. First off I think \$28.50 is a bit high for an 86 page book. I know the color section and hardcover both added to the price, but I am not certain the increased price is justified. Of the 53 photographs several are superfluous. A hardcover is nice for the book collector, but a paperback would be better for sales since the price would be considerably less. I would have also liked to see more discussion of many topics covered in the book. For example, most people are familiar with the name *Corallus enydris*, but the authors use *C. hortulanus* throughout the text for this species. In a footnote they indicate that McDiarmid et al. (in press) has determined that *C. hortulanus* is the correct name. To date this paper has not been published, and no further explanation is offered.

I do not hesitate to recommend this book to anyone with an interest in *Corallus* especially if you plan to keep them in captivity. The book is overpriced however, so I cannot recommend it to someone with a peripheral interest that does not have \$28.50 to spend. Nonetheless, with the increasing number of herpetological books being published today, it is nice to find one that actually has something new to offer.

Classified Ads:

For Sale: Captive born Brazilian rainbow boas, *Epicrates cenchria cenchria*, \$225 each. Special discounts for orders of five or more. Call Breck, 801-752-0297.

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Honduras Natural History Exploration - September, '96, Kenya Herpers Safari - October, '96, Trinidad Exploration - December, '96; Cold-Blooded Australians - January, '97; Herps of Israel - May, '97; & more. Brochures & Information: Herp Quest (619) 630-3058 Fax (619) 631-3802.

AMERICAN FEDERATION OF HERPETOCULTURISTS. A non-profit national membership organization of herpetoculturists, veterinarians, academicians, and zoo personnel involved in the captive husbandry and propagation of amphibians and reptiles. Membership includes the highly acclaimed *The Vivarium* magazine, dedicated to the dissemination of information on herpetocultural accomplishments, herpetological medicine, breeding & maintenance, field studies and adventures, enclosure design and much more. Membership in the AFH is \$28.00. Send information requests to, AFH-News, PO Box 300067, Escondido, CA 92030-0067.

No meeting scheduled this month. There will only be one more newsletter before the association is dissolved. If anyone is interested in having one last meeting/party/get-together please arrange a time and place and I will announce it in the November (final) issue of the newsletter.

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